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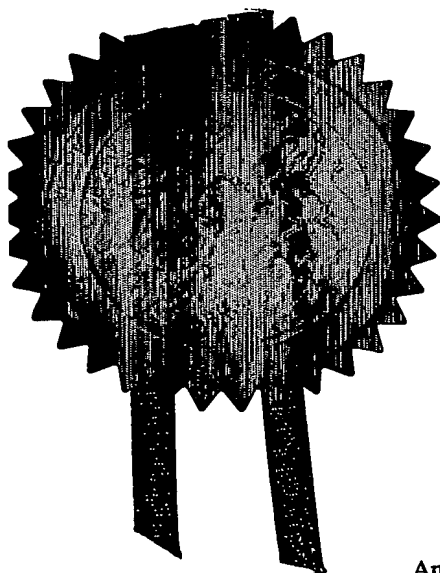
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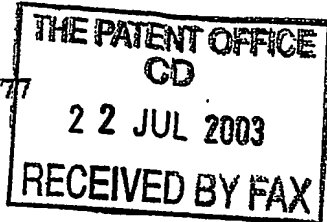


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2. Patent application number (The Patent Office will fill in this part)	0317103.0		02JUL03 E824411-1 D02866 P01/7700 0.00-0317103.0
3. Full name, address and postcode of the or of each applicant (underline all surnames)	Johnson Controls Automotive (UK) Ltd The Hamilton Centre Widford Industrial Estate Chelmsford Essex CM1 3BY United Kingdom United Kingdom		
06300149005 Patents ADP number (if you know it)			
If the applicant is a corporate body, give the country/state of its incorporation			
4. Title of the invention	VEHICLE SEAT SUPPORT STRUCTURE		
5. Name of your agent (if you have one)	ERIC POTTER CLARKSON PARK VIEW HOUSE 58 THE ROPEWALK NOTTINGHAM NG1 5DD		
"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)			
Patents ADP number (if you know it)	1305010	✓	
6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number	Country	Priority application number (if you know it)	Date of filing (day / month / year)
7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application	Number of earlier application	Date of filing (day / month / year)	
8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:	YES		
a) any applicant named in part 3 is not an inventor; or			
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Claims(s) 4

Abstract 0

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Statement of inventorship and right to grant of a patent (Patents Form 7/77) YES

Request for preliminary examination and search (Patents Form 9/77) YES

Request for substantive examination (Patents Form 10/77) NO

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11.

I/We request the grant of a patent on the basis of this application.

Eric Potter Clarkson

Signature

ERIC POTTER CLARKSON

Date

22 July 2003

12. Name and daytime telephone number of person to contact in the United Kingdom

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DUPLICATE

VEHICLE SEAT SUPPORT STRUCTURE

The present invention relates to a vehicle seat support structure and, in particular, a vehicle seat support structure which enables a vehicle seat
5 supported thereby to be moved between pre-set positions which are laterally off-set from one another relative to the vehicle.

According to an aspect of the invention there is provided a vehicle seat support structure for mounting a vehicle seat on a floor of a vehicle for
10 selective movement between first and second positions which are laterally spaced from one another relative to the vehicle, the support structure including a plurality of links, each link being adapted to be pivotally connected at one end to the vehicle seat and at its other end to the vehicle floor.

15 Other advantageous features of the invention are defined in dependent Claims 2-19.

Various aspects of the present invention are hereinafter described, by way
20 of non-limiting examples, with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a vehicle seat mounted on a vehicle floor sub-frame via a vehicle seat support structure according to an
25 embodiment of the present invention;

Figures 1a and 1b are schematic plan views of vehicle seats mounted on the sub-frame of Figure 1 showing the outer seats in their normal and comfort positions respectively;

Figure 2 is a perspective view of the seat shown in Figure 1 with its
30 seat back folded to overlie the seat cushion;

Figure 3 is a perspective view of the folded seat of Figure 2 pivoted forwardly to an upright stowed position;

Figure 4 is a perspective view of the vehicle seat support structure according to an embodiment of the invention shown in its normal position;

5 Figure 5 is a perspective view similar to Figure 4 showing the vehicle seat support structure in its laterally displaced comfort positions; and

Figure 6 is a perspective view from below of the vehicle seat support structure shown in Figure 4.

10 A vehicle sub-frame 10 which, in use, is secured to a vehicle chassis to form part of the vehicle floor, is shown in Figures 1 to 3.

A rear vehicle seat S is mounted on the sub-frame 10. In use, as schematically illustrated in Figure 1a, three seats S₁, S₂ and S₃ are mounted
15 on the sub-frame 10. The outer seats S₁ and S₃ are mounted on the sub-frame 10 via a vehicle seat support structure 12 according to an embodiment of the invention.

The centre seat S₂ is removably mounted on the sub-frame 10, as indicated
20 by arrow R in Figure 1a, to thereby enable each of the outer seats S₁ and S₃ to be moved from its first, laterally outer, position (Figure 1a) to its second, laterally inner, position (Figure 1b).

The first, laterally outer, position of each of the outer seats S₁ and S₃ is
25 referred to as the normal position of the seat and the second, laterally inner, position is referred to as the comfort position of the seat since the seat is spaced further from the vehicle side 14. It is also spaced further from its neighbouring back seat and so provides more sideways room for a passenger seated in the seat than when the seat is in its normal position.

30

Preferably in the comfort position, the seat is also spaced further rearwardly within the vehicle than when in its normal position, thereby giving a passenger seated in the seat more leg room.

- 5 As shown in Figures 4 to 6, the vehicle seat support structure 12 preferably includes a lower support 16 adapted for securance to the sub-frame 10, an upper support 18 upon which the seat is mounted and a plurality of links 20 which movably interconnect the lower and upper supports 16,18.
- 10 The lower support 16 is a generally I-shaped member having two cross-bar portions 22,24 and a central body member 26. Each cross-bar portion 22,24 defines a lower bearing mount 28, at each of its terminal ends, shaped to provide a generally planar bearing surface.
- 15 The upper support 18 is a generally rectangular member having two support members 30,32, each support member 30,32 including a pair of spaced, upper bearing mounts 34 shaped to define a generally planar bearing surface.
- 20 The support members 30,32 are arranged in a parallel arrangement and are interconnected by a release bar 36 at one end and a supplemental bar 38 at the other end. The support members 30,32 are preferably arranged such that the corresponding upper bearing mounts 34 are aligned with each other and are contained within the region enclosed by the support members 30,32,
- 25 release bar 36 and supplemental bar 38.

While the lower and upper supports 16,18 shown in Figures 4 to 6 each include four bearing mounts 28,34, it is envisaged that in other embodiments, the lower and upper supports 16,18 may each include more
30 or less bearing mounts 28,34.

The relative positions of the bearing mounts 28,34 on the lower and upper supports 16,18 are such that when the upper support 18 is positioned to overlie the lower support 16, corresponding lower and upper bearing
5 mounts 28,34 are aligned with each other.

Each of the lower bearing mounts 28 is preferably movably connected to a corresponding upper bearing mount 34 by means of a link 20. In the embodiment shown in Figures 4 to 6, each link 20 includes a pivot arm 40
10 formed to define a generally planar connector portion 42 at each end. The links 20 are also arranged in two pairs, each pair of links 20 defining a four-bar linkage arrangement.

The connector portion 42 at each end of the pivot arm 40 is preferably
15 mounted on the bearing surface of a respective bearing mount 28,34 so that the connector portion 42 is pivotal relative to the bearing mount 28,34.

Preferably, a thrust washer (not shown) is positioned between each connector portion 42 and the bearing surface of the respective bearing
20 mount 28,34 to facilitate pivotal movement of the connector portion 42 relative to the bearing mount 28,34.

The opposed connector portions 42 of each pivot arm 40 are preferably connected by a dog-leg section 44 to ensure that the lower support 16 does
25 not impede movement of the upper portion 18 relative thereto.

The relative positions of the lower and upper bearing mounts 28,34 is preferably chosen such that, in use, the upper support 18 is movable from a position where the upper support 18 overlies the lower support 16, and a

position where the upper support 18 is laterally and rearwardly offset relative to the lower support 16.

5 The upper support 18 may include one or more locking pins (not shown) associated with one or more of the upper bearing mounts 34. The or each locking pin is preferably biased into engagement with an aperture provided in the respective connector portion 42, thereby preventing pivotal movement of the connector portion 42 relative to the bearing mount 34.

10 The or each locking pin is preferably connected to the release bar 36. In such embodiments, the release bar 36 is movably connected at each end to a respective support member 30,32 of the upper support 18 such that, in use, the release bar 36 is movable upwards, away from the lower and upper supports 16,18.

15 Preferably, the or each locking pin is connected to the release bar 36 such that the locking pin is disengaged from the aperture provided in the respective connector portion 42 on upward movement of the release bar 36, and is re-engaged on downward movement of the release bar 36.

20 Preferably, the release bar 36 is biased to return to a position where the or each locking pin is engaged in the aperture provided in the respective connector portion 42 when the release bar 36 is released.

25 The lower support 16 preferably includes a pair of floor latches 46 secured to the underside of one of the cross-bar portions 22,24 for attaching the lower support 16 to the sub-frame 10.

30 On connection of the upper support 18 to the lower support 16, the floor latches 46 are preferably connected to the supplemental bar 38 of the upper

support 18. In such embodiments, the supplemental bar 38 is movably connected at each end to a respective support member 30,32 of the upper support 18 such that, in use, the supplemental bar 38 is movable upwards, away from the lower and upper supports 16,18.

5

Preferably, each floor latch 46 is connected to the supplemental bar 38 such that the floor latch 46 can be engaged with a corresponding striker plate 48 provided on the sub-frame 10 on upward movement of the supplemental bar 38. Similarly, each floor latch 46 can preferably be disengaged from the
10 striker plate 48 on repeated upward movement of the supplemental bar 38.

The lower support 16 also preferably includes a pair of floor hooks 50 secured to the underside of the other of the cross-bar portions 22,24 for attaching the lower support 16 to the sub-frame 10. Preferably each floor
15 hook 50 is engageable with a striker bar 52 provided on the sub-frame 10.

In use, the upper support 18 is secured to the underside of the seat cushion 54 of an outer vehicle seat S_1, S_3 . The upper support 18 is preferably arranged such that the release bar 36 is located beneath the front portion of
20 the seat cushion 54 and the supplemental bar 38 is located beneath the rear portion of the seat cushion 54.

The upper support 18 is movably connected to the lower support 16 by means of links 20 in the form of pivot arms 40, and the lower support 16 is
25 secured to the sub-frame 10 by means of floor latches 46 and floor hooks 50. The upper support 18 is preferably connected to the lower support 16 such that the floor hooks 48 are located beneath the front portion of the seat cushion 54 and the floor latches 46 are located beneath the rear portion of the seat cushion 54.

30

On movement of the release bar 36 in an upward direction, away from the upper support 18, the or each locking pin is disengaged from the aperture provided in the respective connector portion 42. This then allows movement of the upper support 18 relative to the lower support 16 to a position where
5 the upper support 18 is laterally and, preferably, rearwardly offset relative to the lower support 16, thereby moving the seat to its comfort position. On release of the release bar 36, the or each locking pin is re-engaged within the aperture provided in the respective connector portion 42, thereby locking the upper support 18 in the laterally and rearwardly offset position
10 relative to the lower support 16.

The upper support 18 may be returned to a position where it overlies the lower support 16, thereby returning the seat to its normal position, on repeated upward movement of the release bar 36 to disengage the or each
15 locking pin in a similar manner.

The seat S preferably includes a seat back 56 movably connected to the seat cushion 54 such that it is movable between an upright position relative to the seat cushion 54, as shown in Figure 1, and a folded position where the seat
20 back 56 is folded to overlie the seat cushion 54, as shown in Figure 2.

When the seat back 56 is located in its folded position, the floor latches 46 may be disengaged from the striker plates 48 of the sub-frame 10 on upward movement of the supplemental bar 38 located beneath the rear portion of the
25 seat cushion 54.

The support structure 12 may then be tipped forwards about the pivotal connection between the floor hooks 50 and the striker bar 52 provided on the sub-frame 10, thereby pivotally moving the seat cushion 54 forwardly to
30 an upright stowed position, as shown in Figure 3.

The vehicle seat preferably includes a stay (not shown) to maintain the seat cushion 54 in its upright stowed position. In this position, the floor hooks 50 may be disengaged from the striker bar 52, permitting removal of the seat
5 from the vehicle.

While the arrangements described with reference to Figures 1 to 6 require the provision of lower and upper supports 16,18 it is envisaged that, in other embodiments, each of the links 20 may be adapted to be connected at one
10 end directly to the vehicle seat cushion 54 and at its other end directly to the vehicle floor.

CLAIMS

1. A vehicle seat support structure for mounting a vehicle seat on a floor of a vehicle for selective movement between first and second positions
5 which are laterally spaced from one another relative to the vehicle, the support structure including a plurality of links, each link being adapted to be pivotally connected at one end to the vehicle seat and at its other end to the vehicle floor.
- 10 2. A vehicle seat support structure according to Claim 1 further including an upper support adapted for connection to the vehicle seat and a lower support adapted for connection to the vehicle floor, the upper and lower supports being connected to one another by said plurality of links to enable said upper and lower supports to be moved between said first and second
15 positions.
3. A vehicle seat support structure according to Claim 2 wherein the lower support is pivotally mounted at one end to enable the support structure to be tipped relative to said floor.
- 20 4. A vehicle seat support structure according to any preceding claim wherein two pairs of links are provided, the links of each pair defining a four-bar linking arrangement.
- 25 5. A vehicle seat support structure according to Claim 2 and any claim dependent thereon wherein the upper support is laterally and rearwardly offset relative to the lower support in the second position.
6. A vehicle seat support structure according to Claim 2 and any claim
30 dependent thereon wherein the upper support includes releasable locking

means to releasably lock the upper support in position relative to the lower support.

7. A vehicle seat support structure according to Claim 2 and any claim
5 dependent thereon wherein the lower support includes releasable locking means adapted to secure the lower support to the vehicle floor.

8. A vehicle seat support structure according to Claim 2 and any claim dependent thereon wherein:

10 (i) the lower support is a generally I-shaped member having two cross-bar portions and a central body member, each cross-bar portion defining a lower bearing mount at or towards each of its terminal ends;

(ii) the upper support is a generally rectangular member having two generally parallel support members, each support member including a pair
15 of spaced upper bearing mounts; and

(iii) each link connected between a respective pair of lower and upper bearing mounts.

9. A vehicle seat support structure according to Claim 8 wherein the
20 relative positions of the bearing mounts on the lower and upper supports are such that when the upper support is positioned to overlies the lower support, corresponding lower and upper bearing mounts are aligned with each other.

10. A vehicle seat support structure according to Claim 8 or Claim 9
25 wherein each bearing mount is shaped to define a generally planar bearing surface.

11. A vehicle seat support structure according to Claim 10 wherein each link includes a pivot arm formed to define a generally planar connector
30 portion at each end, each connector being mounted on the bearing surface of

a respective bearing mount such that the connector portion is pivotal relative to the bearing mount.

12. A vehicle seat support structure according to Claim 11 wherein a thrust washer is located between each bearing mount and a respective connector portion.

13. A vehicle seat support structure according to Claim 6 and any one of Claims 8-12 wherein the releasable locking means includes at least one locking pin associated with one or more of the upper bearing mounts, the or each locking pin being releasably engageable with the link connected to the upper bearing mount to prevent movement of the upper support relative to the lower support.

14. A vehicle seat support structure according to Claims 11 and 13 wherein the or each locking pin is biased into engagement with an aperture provided in the respective connector portion to prevent pivotal movement of the connector portion relative to the upper bearing mount.

15. A vehicle seat support structure according to Claim 14 wherein the upper support includes a release bar movably connected at each end to a respective support member, the or each locking pin being connected to the release bar such that on movement of the release bar the or each locking pin is disengaged from the aperture provided in the respective connector portion.

16. A vehicle seat support structure according to Claim 15 wherein the release bar is biased to return to a positions where the or each locking pin is engaged in the aperture provided in the respective connector portion.

17. A vehicle seat support structure according to any of Claims 8 to 16 wherein the lower support includes at least one floor latch on its underside adapted to releasably secure the lower support to the sub-frame.
- 5 18. A vehicle seat support structure according to Claim 17 wherein the upper support includes a supplemental bar movably connected at each end to a respective support member, the or each floor latch being connected to the supplemental bar when the upper support is connected to the lower support such that on movement of the supplemental bar the or each floor
10 latch is engageable and disengageable relatively with the sub-frame.
19. A vehicle seat support structure according to Claim 17 or Claim 18 wherein the lower support further includes at least one floor hook on its underside adapted to releasably secure the lower support to a striker bar on
15 the sub-frame such that on release of the or each floor latch, the lower support is pivotal about the striker bar.
20. A vehicle seat support structure generally as herein described with reference to and/or as illustrated in the accompanying drawings.

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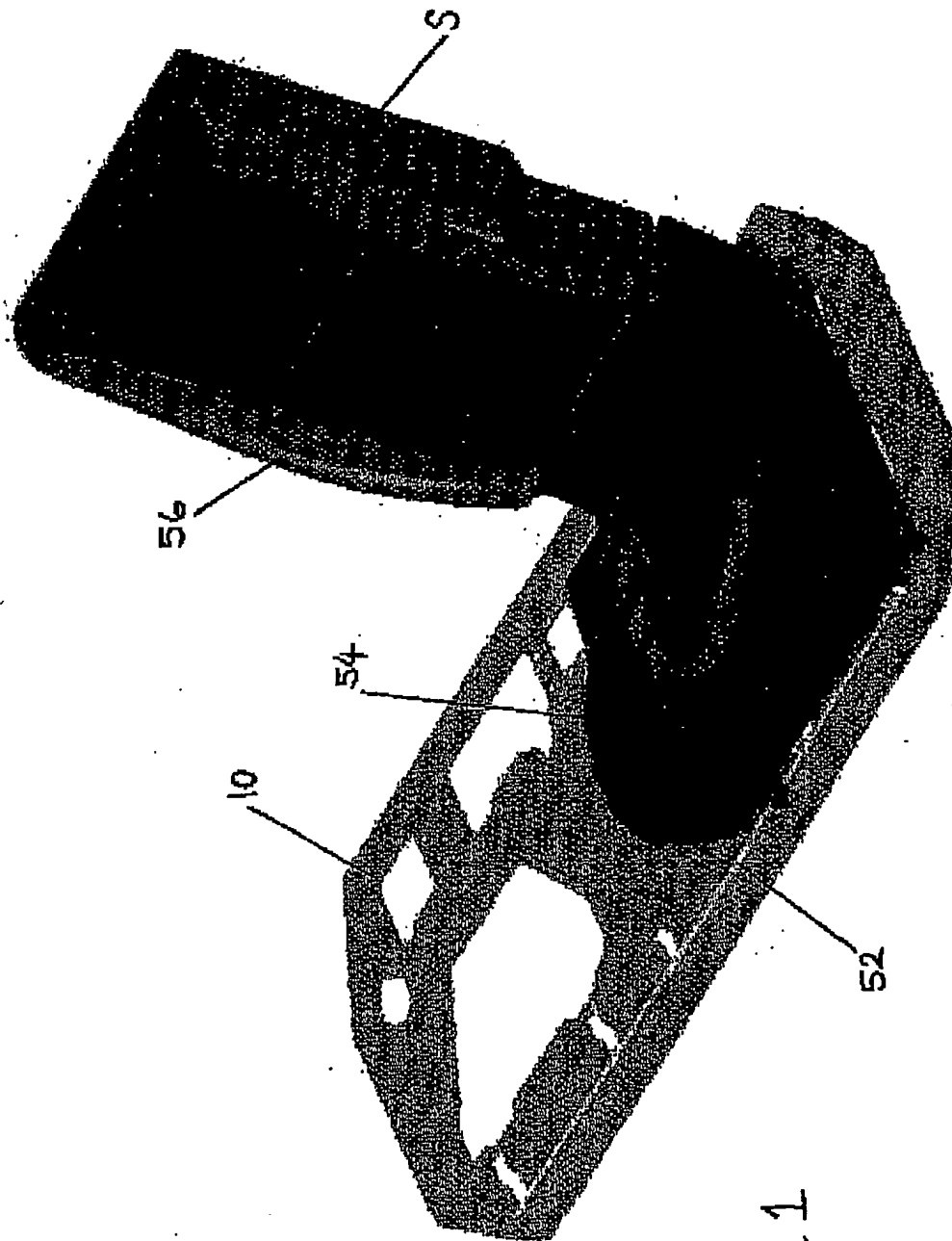


Figure 1

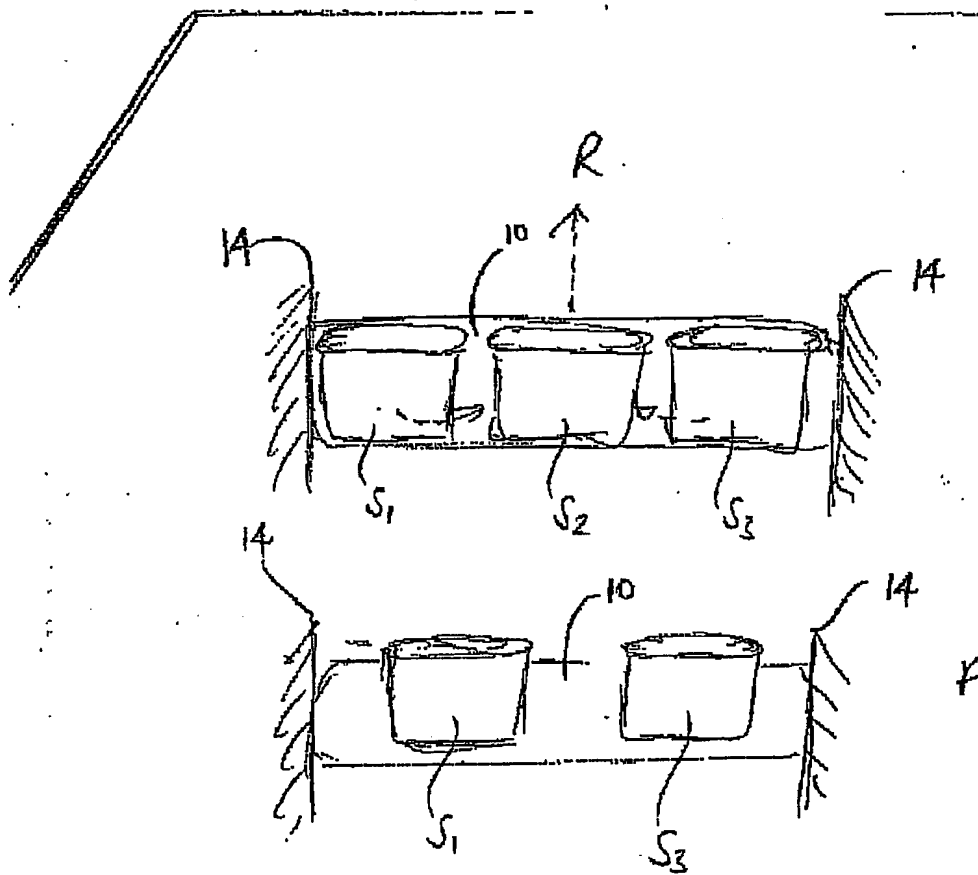
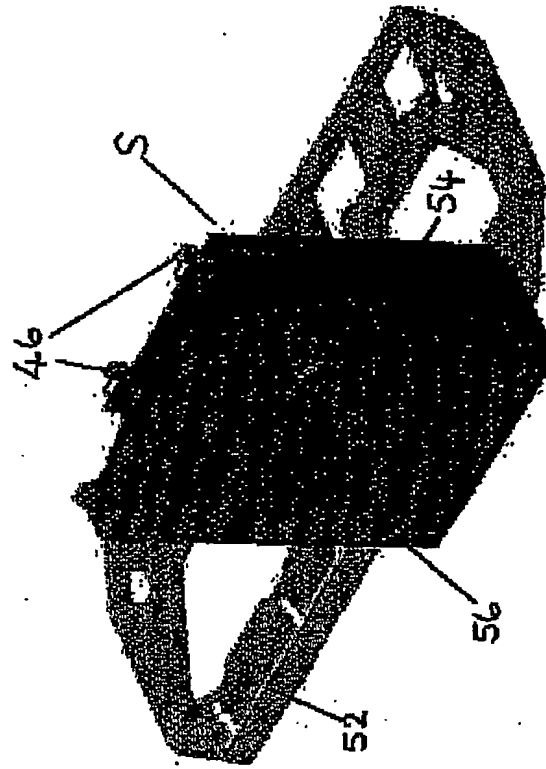
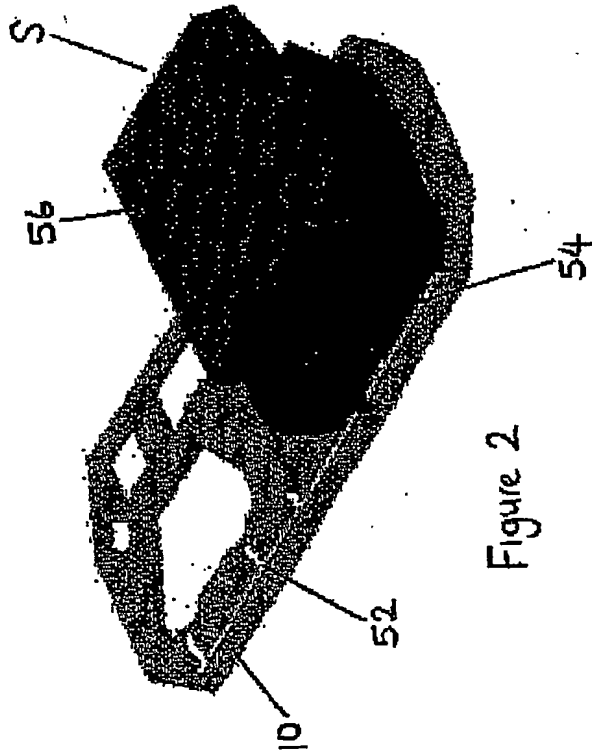
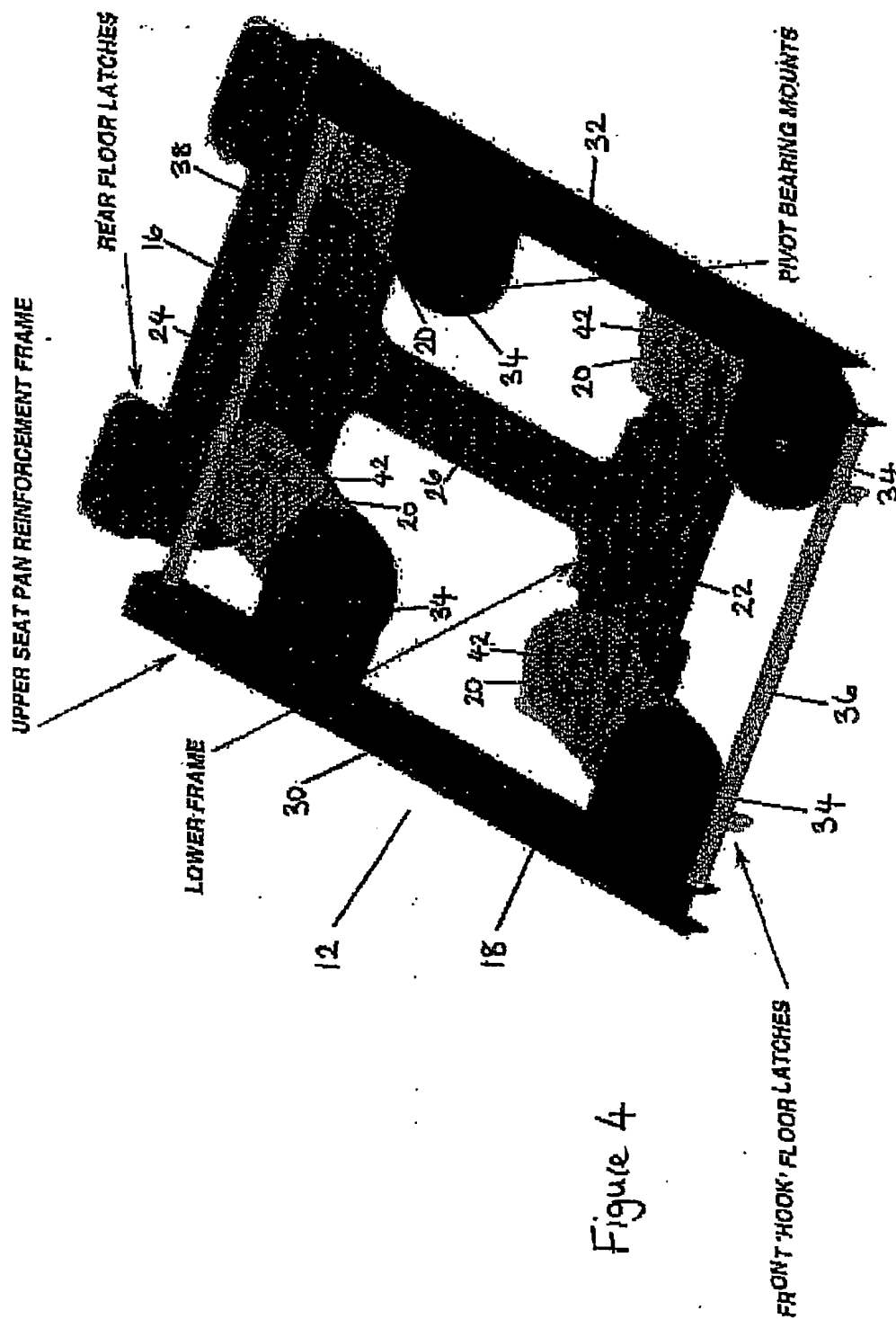


Fig. 1a

Fig. 1b





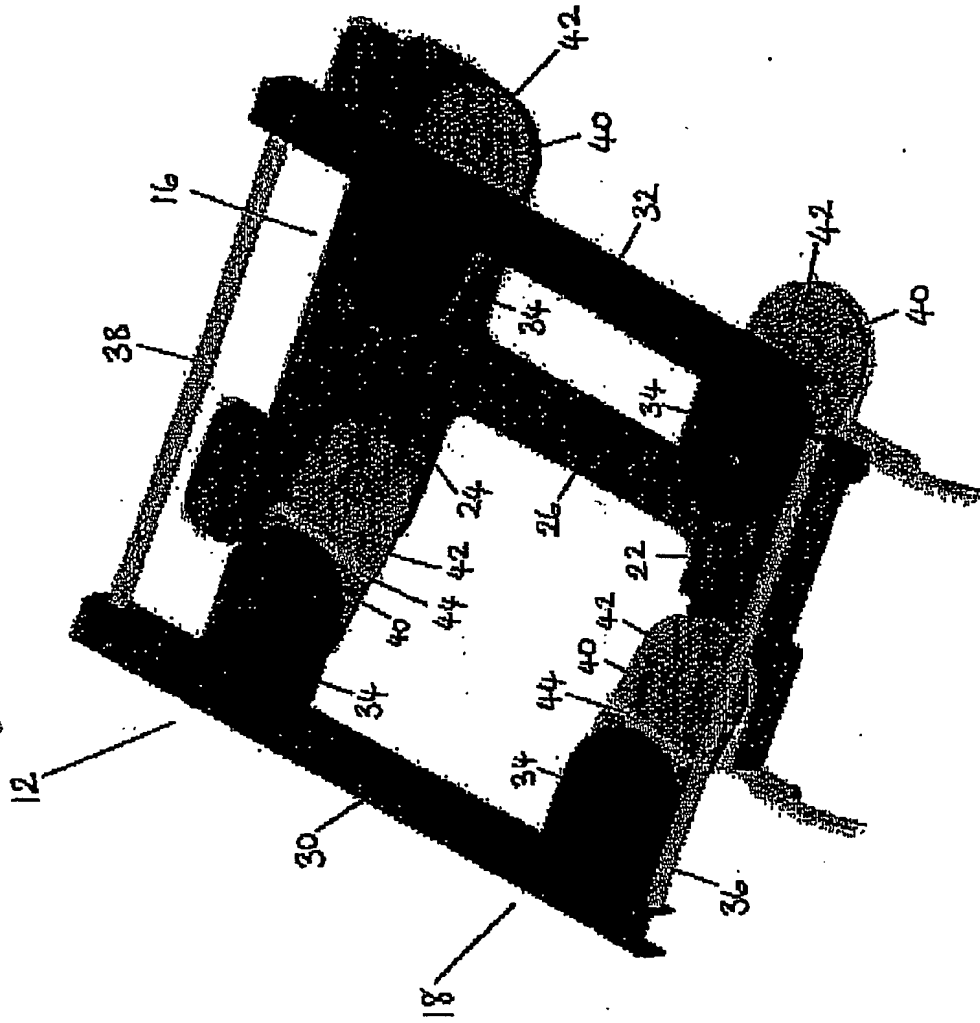


Figure 5

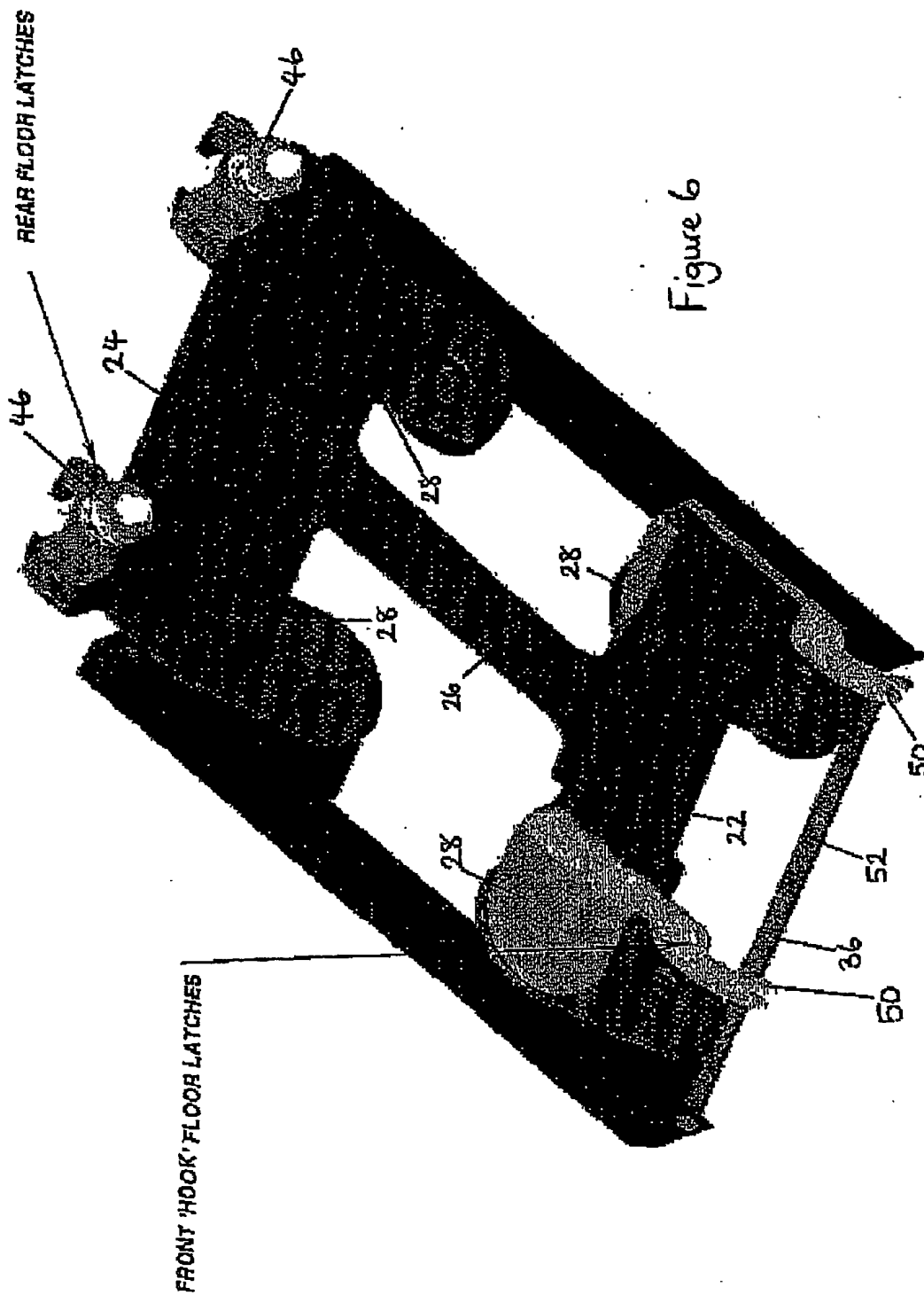


Figure 6

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